

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
22 September 2005 (22.09.2005)

PCT

(10) International Publication Number  
**WO 2005/087208 A3**

BEST AVAILABLE COPY

(51) International Patent Classification<sup>7</sup>: **A61K 31/01**,  
31/015, 31/07, A23L 1/30, A61P 39/06, 43/00

(21) International Application Number:  
PCT/US2005/007651

(22) International Filing Date: 10 March 2005 (10.03.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/551,742 10 March 2004 (10.03.2004) US

(71) Applicant (for all designated States except US):  
**TRUSTEES OF TUFTS COLLEGE** [US/US]; Tufts  
University, Medford, MA 02155 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **YEUM, Kyung-Jin**  
[KR/US]; 29 Lockeland Road, Winchester, MA 01890  
(US).

(74) Agents: **ENGELLENNER, Thomas, J.** et al.; Nutter Mc-  
Clennen & Fish LLP, World Trade Center West, 155 Sea-  
port Boulevard, Boston, MA 02210-2604 (US).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ,  
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA,  
ZM, ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,  
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,  
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— with international search report

(88) Date of publication of the international search report:  
3 November 2005

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: SYNERGISTIC EFFECT OF COMPOSITIONS COMPRISING CAROTENOIDS SELECTED FROM LUTEIN,  
BETA-CAROTENE AND LYCOPENE

(57) Abstract: The methods of the invention can be used to protect against lymphocyte DNA damage and free-radical associated disorders in a subject. The methods of the present invention can be used to increase the antioxidant capacity in both the aqueous and lipid compartments, decrease DNA oxidation, decrease lipid peroxidation, and increase antioxidant nutrient levels in the circulation. The protective effect of the physiologic dose of the mixed carotenoid supplement is rapid, consistent and cumulative.

WO 2005/087208 A3